

Interim Wastewater Pond Management Plan
US Magnesium LLC
Rowley, Utah

Submitted to: U.S. Environmental Protection Agency, Region 8

Prepared by: US Magnesium LLC

October 6, 2017

Table of Contents

Page

1.0	INTRODUCTION	1-1
1.1	BACKGROUND	1-1
1.2	PURPOSE	1-2
2.0	PROJECT ELEMENTS.....	2-1
2.1	CONSTRUCTION PROJECTS	2-1
2.2	INSPECTION AND MONITORING PLAN	2-3
2.3	GROUNDWATER DISCHARGE PERMIT – CONTAINED WASTEWATER POND.....	2-3

APPENDICES

A	Inspection and Monitoring Plan - Current Wastewater Pond Embankments
B	Issued for Construction Current Waste Pond Contingent Measures Plans and Specifications and DWQ Construction Permit
C	Photographs

FIGURE

1	Features for Interim Management at the Current and Old Wastewater Pond.....	1-3
---	---	-----

1.0 INTRODUCTION

1.1 BACKGROUND

On November 21, 2016, US Magnesium LLC (USM) received a letter from the Utah Department of Environmental Quality Division of Water Quality (DWQ) directing USM to, among other actions related to the Skull Valley Diversion Ditch (SVDD): (1) prepare an inspection and monitoring plan and contingency plan for the Current Wastewater Pond (CWP), (2) perform a geotechnical assessment of the integrity of the CWP impoundment, and (3) submit a permit application for a ground water discharge permit for the CWP. In a letter dated December 21, 2016 USM provided a response to DWQ that, among other actions related to the SVDD, USM would: (1) prepare an inspection and monitoring plan and contingency plan for the CWP, (2) submit a report for the geotechnical assessment of the CWP impoundment conducted on November 14, 2016, and (3) submit an application for a ground water discharge permit for the CWP.

On March 15, 2017, USM transmitted the Inspection and Monitoring Plan (IMP) for the CWP that included a Contingency Plan. The IMP and Contingency Plan are contained in Appendix A. The Contingency Plan described measures related to the SVDD and construction of a new spillway or culvert from the CWP to the old waste pond. USM committed to submit the plans and specifications for the contingency measures to DWQ on or before March 24, 2017.

On March 24, 2017, USM transmitted the draft plans and specifications for the planned contingency measures described in the Contingency Plan and noted that, following DWQ review and approval, the plans and specifications would be finalized, stamped and signed by a Professional Engineer (PE) registered in Utah, and issued for construction (IFC). On April 13, 2017, the PE stamped and signed IFC plans and specifications, revised consistent with DWQ's input, were transmitted to DWQ. On April 27, 2017, DWQ issued a Construction Permit for the planned contingency measures for the CWP. A copy of the DWQ Construction Permit and USM plans and specifications are contained in Appendix B.

By letter dated July 21, 2017, U.S. Environmental Protection Agency (EPA) Region 8 directed USM to take immediate, interim and long-term actions to permanently address ongoing discharges of process wastewater from USM onto Bureau of Land Management (BLM) property located north of the northwest corner of the USM active wastewater impoundment. During an EPA-USM conference call on August 29, 2017 to discuss the EPA's concerns expressed in its July 21, 2017 letter, USM described the actions it has taken and plans to implement and prevent discharge of process wastewater to the surface of the area to the northwest of the CWP (also known as the "Angel Wing" area). In summary, USM described three specific immediate/interim measures to address EPA's concerns:

-
1. Repair and reinforce the north berm of the CWP;
 2. Install the DWQ-permitted overflow pipe from the CWP to the old waste pond; and
 3. Construct a new dike at the narrows between the northeast embankment of the CWP and the gypsum pile to separate the southeastern and northwestern portions of the CWP.

The locations of the above-described features are shown on Figure 1 that was provided to EPA to facilitate discussion during the August 29, 2017 conference call. During that call, USM also stated that the repairs to the north embankment had been completed, that there was no standing wastewater in the area between the north embankment and the northwest embankment, and that a small area of ponded water to the northwest of the northwest embankment (in the Angel Wing area) did not extend beyond the warning-signed fence. EPA requested that USM prepare a work plan describing the above-summarized measures and include photographs documenting the status of the CWP as described during the conference call. Photographs are contained in Appendix C.

1.2 PURPOSE

US Magnesium LLC (USM) prepared this Interim Wastewater Pond Management Plan (PMP) as requested by U.S. Environmental Protection Agency (EPA) Region 8 during the EPA-USM conference call on August 29, 2017. This PMP integrates the projects USM has and will undertake to manage the CWP to prevent releases of wastewater beyond the northwest embankment and to the SVDD beyond the eastern-most containment berm. The additional actions proposed during the August 29, 2017 EPA-USM conference call and the DWQ-directed inspections and contingency measures are described in detail in Section 2.

Figure 1. Features for Interim Management at the Current and Old Wastewater Pond



2.0 PROJECT ELEMENTS

The construction elements are described in sequential order, followed by a summary of the inspection and monitoring plan and long-term pond containment system consistent with the Groundwater Discharge Permit process under DWQ.

2.1 CONSTRUCTION PROJECTS

1. USM has repaired and fortified the CWP north embankment to minimize the potential for wastewater to flow and impound against the northwest embankment. The northwest embankment will now function only as secondary containment to prevent release to the Angel Wing area in the event there is a wastewater release through the north embankment.

During the week of August 21, 2017, USM personnel repaired a breach in the north dike that had allowed wastewater to flow and fill the area between the north and northwest embankments during fall 2016. Photographs 1 and 3 (August 30, 2017) show the completed initial north dike repairs. Photographs 5 and 7 (August 30, 2017) show the lack of surface water in the area between the north and northwest embankments at the time of the initial north embankment repair.

During the weeks of September 11 and 25, 2017, USM personnel placed, dozed and compacted approximately 3,800 tons of silty-clay soil to fortify and widen the north embankment. Photographs 2 and 4 (September 28, 2017) show the widening of the north dike that included placement of soil to create a truck turnaround (Photograph 6) that significantly fortified the area of the former breach and will facilitate future maintenance. During the week of October 2, 2017, USM personnel completed reinforcement and widening of the north embankment, including construction of an additional truck turnaround near its east end.

2. USM will install the DWQ permitted overflow from the current wastewater pond into the old pond. The overflow pipe will maintain the water level in the southeastern area of the current waste pond at a water level of approximately 4,214 feet, which will significantly reduce the hydraulic pressure on the CWP embankments. Note that the area of inundation for the CWP shown on Figure 1 corresponds to a water level of 4,215 to 4,215.5 feet.

During a contractor bidding site walk, USM's engineer observed that the actual topography at the overflow pipe alignment is not sufficiently captured on the "smoothed" contours generated by the CAD topographic map used for the cross section on the DWQ-approved, issued for construction [IFC] Drawing SK-170314,

Rev. 0, Acid Waste Pond Overflow Pipe. As discussed by USM and DWQ personnel on September 25, 2017, Drawing SK-170314, Rev. 0 was based on a CAD-generated topographic map using the November 2015 LIDAR topographic survey data. The LIDAR point topographic data were surveyed on a 6-inch by 6-inch grid; however, the smoothed topographic map appears to have been generated with a censored data set on about a 5-foot by 5-foot grid. USM provided DWQ with IFC Drawing SK-170314, Rev. 1, Acid Waste Pond Overflow Pipe based on the LIDAR 6-inch by 6-inch grid topographic data. The detailed topographic cross section on Drawing SK-170314, Rev. 1 shows three changes to the details of the design:

- the roadway will be built up to provide a minimum of 2-feet of roadbase above the pipe;
- the invert pipe elevation is only about 4 to 6 inches above the top of the existing HDPE liner so the pipe will be placed over the top of the liner (the smoothed contours on Drawing SK-170314, Rev. 0 indicated that the pipe would penetrate and thus be sealed/booted to the existing liner); and
- addition of a butterfly valve.

Drawing SK-170314, Rev. 1, Acid Waste Pond Overflow Pipe and DWQ's October 5, 2017 approval of the minor modifications to the design are contained in Appendix B. USM is in the process of receiving and evaluating bids from qualified contractors, procuring the pipe and valve, and plans to proceed with construction of the project in October 2017.

3. USM will construct a new dike at the narrows between the current waste pond northeast embankment and the gypsum pile. The new dike will largely cut off hydraulic connectivity between the southeastern and northwestern portions of the CWP and prevent low pH wastewater flow to the north embankment. Gypsum slurry water will continue to impound in the area north of the new dike but this water has a pH in the range of 3 to 6 and consists of calcium sulfate, calcium chloride and residual calcium carbonate. The pH and composition of the gypsum slurry water will minimize potential for reaction (dissolution) of the calcium carbonate oolitic sands underlying the north embankment and thus minimize the potential for piping under the embankment. Because the new separation dike will be temporary and not intended for traffic loads, USM does not intend the dike to be an engineered feature. On-site borrow material will be placed to fill the channel from the bottom first and then built up to a height 3-feet above the current water level of approximately 4,215 feet. The dike will be approximately 30 feet wide at the base and 12 feet wide across the crown and span the entire width of the channel. The new separation dike will be

constructed in late October or November 2017 after the overflow pipe has been installed.

EPA's July 21, 2017 letter also states that "USM must assess the areal extent of the recent release and reconstruct the fence, with warning signs installed under the February 2014 EPA RCRA AOC, to ensure the public is not exposed to acidic water contaminated with chlorinated hydrocarbons." As shown on Photographs 8, 10 and 11 (August 30, 2017), a small pond of residual water remained in the area beyond the northwest embankment (in the Angel Wing area). The residual ponded water was entirely within the existing fenceline and the warning signs remain posted and legible. The warning signs are 9 inches by 12 inches and display "Warning - Keep Out - Hazardous Materials Area Beyond This Point." Photograph 9 (September 28, 2017) shows ponded water within the posted, fenced area, but the ponded water is likely primarily or entirely rainwater that accumulated in this low area. Over the weekend of September 23 and 24, 2017, USM recorded 1-inch of precipitation at the rain gauge located at the plant site. USM anticipates that the measures described in this PMP will prevent any future releases to the Angel Wing area; however, the existing fence and signs will be maintained as originally installed.

2.2 INSPECTION AND MONITORING PLAN

USM will continue implementation of monitoring and maintenance pursuant to the Inspection and Monitoring Plan for the Current Wastewater Pond, submitted March 15, 2017, as required by Utah Department of Environmental Quality Division of Water Quality (DWQ). That plan will be revised to include inspection and maintenance of the constructed features described in this PMP including:

- North embankment;
- Overflow pipe; and
- Separation dike.

In addition, inspection and maintenance of the old wastewater pond embankment will be added to the Inspection and Monitoring Plan. Inspection of the north embankment has been added to USM's CWP Embankment Inspection Log form and the other features will be added when construction has been completed.

2.3 GROUNDWATER DISCHARGE PERMIT – CONTAINED WASTEWATER POND

As described in the introduction, DWQ directed USM to submit a permit application for a Ground Water Discharge Permit (GWDP) for the CWP. USM retained MWH, now Stantec, to prepare the initial GWDP application on behalf of USM.

During a permit application kick-off meeting with DWQ on February 1, 2017, the key GWDP application data gaps that were identified included the following:

-
- Hydrogeologic characteristics of the deeper silty clay unit beneath the CWP
 - Baseline groundwater quality
 - Aquifer properties of the shallow and confined deeper aquifer zones, including vertical hydraulic gradients
 - Neutralization capacity of soils beneath the CWP
 - Water balance for combined plant discharge to the CWP
 - CWP water balance

On May 2, 2017, Stantec transmitted a GWDP Application Preparation - Field Data Collection Work Plan to DWQ summarizing the planned field work and data acquisition to fill the identified data gaps. Based on comments from the EPA, USM agreed to work plan modifications to address those comments in its response dated May 12, 2017. In summary, the modified work plan included the following field work:

- **Extent, Thickness and Properties of Deeper Silty Clay Unit**
 - 5 Angled borings beneath CWP, 2 vertical boring and 4 new monitoring wells
- **Baseline Groundwater Quality**
 - Perform a baseline round of groundwater sampling at the 4 new monitoring wells and 7 additional groundwater sampling rounds at 10 monitoring wells
- **Aquifer Properties** - hydraulic conductivity (HC), transmissivity and current groundwater levels/gradients
 - Soil samples from borings/new monitoring well borings for laboratory HCs
 - Pneumatic slug tests at 10 monitoring wells
 - Pump test at new monitoring well MW-22B
 - Measure depths to groundwater at all available site-wide wells
- **Neutralization Capacity of Soils/Sediments beneath CWP**
 - CaCO₃ equivalent every 5 feet in borings/new monitoring well borings
 - Clay mineralogy of deeper silty clay unit
- **Plant Facility Water Quality and Combined Flow Rate**
 - Plant effluent sampling and analyses
 - Plant discharge flow rate – measured using a recently installed Cutthroat flume

The majority of the Stantec field work, including the drilling, soil sampling, well installations, site-wide groundwater level measurements, and pneumatic and pump testing, was completed

during June 2017. Baseline groundwater sampling from the new monitoring wells was completed in July, August, and September 2017. Due to supplier and transportation delays, installation of the Cutthroat flume to measure the combined wastewater flow in the main ditch was delayed until the week of August 7, 2017. Flow measurement and data logging began during the week of August 14, 2017. Stantec collected a combined plant effluent sample and a round of groundwater sampling during the week of August 7, 2017. During the week of September 11, 2017, Stantec completed a second round of site-wide groundwater level measurements and groundwater sampling. Following substantial completion of the field work and initial and on-going data acquisition, Stantec proceeded with developing: (1) a preliminary contained wastewater pond water balance using the measured plant discharge flow rate and literature/data reviews to confirm/update previously estimated precipitation and evaporation rates; and (2) a three-dimensional groundwater flow model that will be used to simulate the contained wastewater pond performance and potential influence on the groundwater gradients and flow directions at the site.

In a September 29, 2017 meeting, USM and Stantec updated DWQ on the status of preparation of the GWDP application, including the GWDP field data acquisition, data evaluations, water balance, and groundwater model. As discussed with DWQ during the meeting, the data and evaluations support a GWDP for a contained wastewater pond at the site. However, based on the current water balance for the contained pond, the required working surface area of the pond exceeds the area of the conceptual pond retrofit proposal. USM is proceeding with development and evaluation of several alternate configurations for the wastewater pond that will meet the requirements for current and future plant operations and a GWDP. USM will continue working with the DWQ to submit the GWDP application this year.

APPENDIX A

Inspection and Monitoring Plan - Current Wastewater Pond Embankments

Inspection and Monitoring Plan

Current Wastewater Pond Embankments

US Magnesium LLC

March 15, 2017

1.0 PURPOSE

This Inspection and Monitoring Plan (IMP) provides a detailed description of the methods and procedures for performing and documenting the routine inspections as well as reporting requirements in the event that a release is identified. This IMP was prepared as specified in US Magnesium's December 21, 2016 response to the Utah Department of Environmental Quality, Division of Water Quality (DWQ) Warning Letter of Violation received by US Magnesium on November 21, 2016.

2.0 INSPECTION FREQUENCY

Inspections will be performed daily Monday through Friday during periods when the pond water level is in direct contact with the embankments. During the summer months when the water level retreats and is not in contact with the embankments, the inspections will be performed weekly.

3.0 INSPECTION PROCEDURES

The inspections will be performed by qualified US Magnesium personnel, typically the Environmental Manager, Environmental Coordinator or their designee.

The inspections of the current wastewater pond embankments will encompass the four inspection areas shown on Figure 1. Each inspection will be performed with two passes, one beginning from the southwest corner of Inspection Area 1 and progressing counterclockwise to the southwest corner of Inspection Area 4, and a second progressing clockwise back to the beginning point. The inspector will drive at an appropriately slow speed to be able to safely observe the condition of the embankments while driving. Areas identified during the driving inspection that are potentially problematic will also be inspected on foot. The inspector will be looking for the following indicators of damage to or loss of the integrity of the embankments:

- Seepage from or piping through the outside of the embankment
- Subsidence/sinkholes in the top/side slopes of the embankments
- Undercutting on the inside of the embankments
- Animal burrows on the top/side slopes of the embankments

For Inspection Area 1, the inspection will include observation of the condition of the earthen containment berms in the section of the Skull Valley Diversion Ditch (SVDD) adjacent to the south side of the Current Wastewater Pond.

If seepage from or piping through the outside of the embankment or other damage that could impair the integrity of the embankment is observed, then maintenance will be performed up to and including implementation of the contingency plan.

4.0 DOCUMENTATION AND REPORTING

The inspections will be documented on a field form. An example form is attached to this IMP.

US Magnesium will report any releases resulting from loss of containment through the embankment outside of the current perimeter of the Current Wastewater Pond (i.e., Preliminary Investigation Areas 5, 6 and 8), not releases to groundwater from pond operations. US Magnesium will provide verbal notification via telephone to DWQ on the same day that any such release is identified during the inspections. The notification will include a description of the release and a schedule for maintenance and repairs to the area of the embankment to stop the release.

5.0 MAINTENANCE

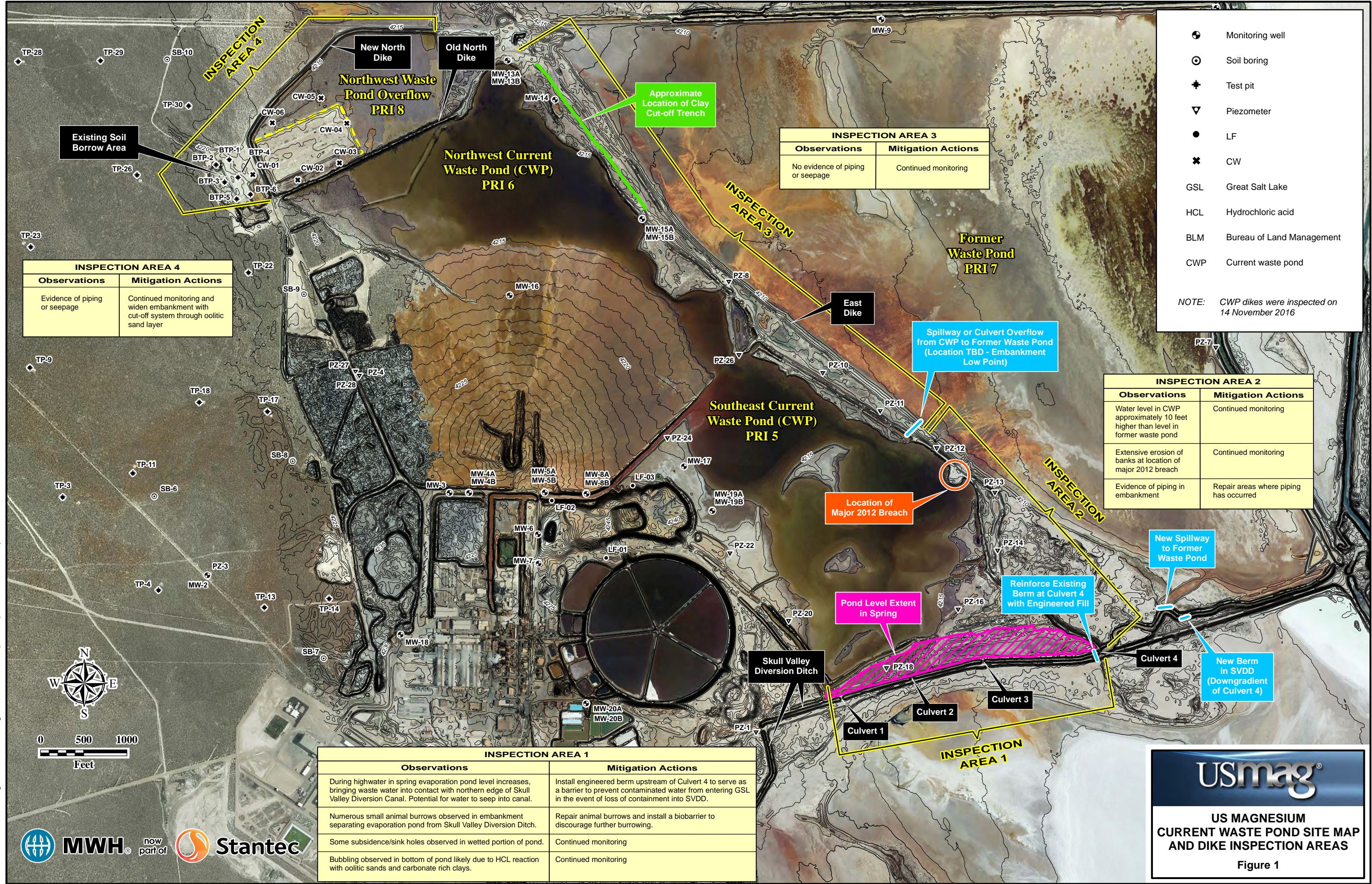
If seepage from or piping through the outside of the embankment is observed, the area will be repaired on a priority basis. The repairs will typically involve excavation down to the seep on the outside of the embankment and replaced with compacted clayey soil. Then the inside portion of the embankment will be excavated and replaced with compacted clayey soil. After the initial repairs, the area will be evaluated consistent with the Contingency Plan which is contained in Appendix A to this IMP.

If damage that could impair the integrity of the embankment (e.g., undercutting, sinkholes, burrows) is observed during an inspection, then maintenance will be performed. The maintenance will generally involve adding soil to reinforce the embankment or fill the burrows/sinkholes.

Current Wastewater Pond Embankment Inspection Field Form

Date:	Time:	Inspector (initials):	
Weather/Ground Conditions:			
Inspection Area	Inspection Item	None Observed	Yes (Enter Comment Below)
1	Seepage from or piping through the outside of the embankment		
	Subsidence/sinkholes in the top/side slopes of the embankments		
	Excessive undercutting on the inside of the embankments		
	Animal burrows on the top/side slopes of the embankments		
	Breaches or seepage through the containment berms in the SVDD		
2	Seepage from or piping through the outside of the embankment		
	Subsidence/sinkholes in the top/side slopes of the embankments		
	Excessive undercutting on the inside of the embankments		
	Animal burrows on the top/side slopes of the embankments		
3	Seepage from or piping through the outside of the embankment		
	Subsidence/sinkholes in the top/side slopes of the embankments		
	Excessive undercutting on the inside of the embankments		
	Animal burrows on the top/side slopes of the embankments		
4	Seepage from or piping through the outside of the embankment		
	Subsidence/sinkholes in the top/side slopes of the embankments		
	Excessive undercutting on the inside of the embankments		
	Animal burrows on the top/side slopes of the embankments		
Comment (for any unacceptable condition[s]): <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>			

Drawn by D. Severson
14 Mar 2017
C:\Data\MWHPB&L & US Magnesium\FIGURES\Fig 2_US_MAG_Site Map and Inspection Areas_Lidar Topo_11x17_No Cross Sec Locs_14Mar2017.mxd



APPENDIX A

Contingency Plan

This Contingency Plan documents potential scenarios for loss of containment from the Current Wastewater Pond, including when increased monitoring frequency and possible corrective action (such as construction of a containment berm) are required.

The most likely scenario for loss of containment from the Current Wastewater Pond would be a result of the low-pH wastewater dissolving carbonate-rich clays and possibly oolitic sands beneath the pond and carbonate-rich clays within the embankments which creates a channel (or “pipe”) through the side or base of the embankment. The occurrence of dissolution piping is consistent with the loss of containment observed and described in the MWH/Stantec Technical Memorandum – Current Waste Pond Embankments Visual Inspection and Recommended Interim Measures, February 1, 2017 (Technical Memorandum). Another scenario for loss of containment from the Current Wastewater Pond would be the pond water level exceeding the elevation of the low points of the embankment resulting in pond water overtopping the embankment. There is a low probability that the embankments would fail due to animal burrowing and maintenance will address burrowing identified during the inspections.

Specific interim actions to prevent potential pond water piping through and/or overtopping the embankment were identified in US Magnesium’s December 26, 2016 letter, and are mentioned below for each Inspection Area.

In the event of a release or imminent release of wastewater from the Current Wastewater Pond, the primary contingency measure will be to divert that water into the former waste pond (PRI 7). Specific contingency measures for each Inspection Area are described below.

Inspection Area 1

As an interim action to prevent any release from the Current Wastewater Pond migrating to the Great Salt Lake, US Magnesium has constructed four containment berms in the Skull Valley Diversion Ditch (SVDD). US Magnesium will reinforce the berm on the upgradient side of culvert 4 with engineered and compacted fill. The location of that berm is shown on Figure 1. The other three berms upgradient from the reinforced culvert 4 berm will remain and will be incorporated in backfilling the portion of the SVDD adjacent to the Current Wastewater Pond or other appropriate strategy as a part of the construction of the permanent retrofits of the CWP.

In addition, as an interim action suggested by the EPA RPM for the US Magnesium site, US Magnesium will install a fifth containment berm east and downgradient of culvert 4. As a contingency measure, an overflow spillway will be cut into the berm to allow any water in the SVDD below culvert 4 to be diverted into the former waste pond (PRI 7) and thus prevent potential overtopping of the new SVDD containment berm. The locations of the new containment berm and spillway are shown on Figure 1. US Magnesium anticipates constructing the new containment berm and spillway in April or May 2017.

Inspection Areas 2 and 3

As a contingency measure recommended by DWQ staff, US Magnesium is evaluating construction of a spillway or culvert(s) that would allow Current Wastewater Pond water to flow into the former waste pond (PRI 7) and thus prevent potential overtopping of the pond embankment. US Magnesium has retained Stantec to provide options and a recommendation for the location of the spillway or culvert(s). When the design is finalized, US Magnesium will provide the design and plans, and the circumstances for its use, to DWQ for comment and approval prior to commencing construction. US Magnesium is targeting May or June 2017 for construction of the new spillway or culvert(s).

Inspection Area 4

The contingency measure described for Inspection Areas 2 and 3 will function as the contingency measure for Inspection Area 4 due to the hydraulic interconnection within the Current Wastewater Pond at the current relatively high water level.

As an interim action prior to approval and construction of the permanent retrofits of the CWP, the New North Dike will be widened to increase the required flow length of potential seepage. To address the concern associated with the presence of readily dissolvable oolitic sands potentially underlying the New North Dike, a cut-off system will be incorporated into the widened embankment to intersect the oolitic sands. The cut-off system would extend from Inspection Area 4 to the northern end of Inspection Area 3.

APPENDIX B

Issued for Construction Current Waste Pond Contingent Measures Plans and Specifications
DWQ Construction Permit



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Erica Brown Gaddis, PhD
Director

OCT 05 2017

Tom Tripp
Director of Technical Services and Development
238 North 2200 West
Salt Lake City, UT 84116-2921

Dear Mr. Tripp:

Subject: Approval of the Minor Changes to the Construction Permit and Engineering Drawing

On April 27, 2017 a Construction Permit was issued for the Planned Contingency Measures for the Current Wastewater Pond. On September 25, 2017, I met with Rob Hartman out at your site and he took a few minutes to explain and show me on a new drawing the proposed minor changes to that Construction Permit. I asked Rob to send me an email giving me the details in a written format. On September 28, 2017 I received that email. The three main changes are as follows:

1. The roadway will be built up to provide a minimum of 2-feet of road base above the overflow pipe,
2. The elevation of the HDPE pipe has changed with the inlet elevation being 4214.00 and the outlet elevation being 4213.46, and
3. Installation of a butterfly valve.

These changes are hereby approved.

If you have any questions about this letter please contact me at (801) 536-4353 or wwcampbell@utah.gov.

Sincerely,

Woodrow Campbell, P.E.
Environmental Engineer
Ground Water Protection Section

WWC:DJH:smm

cc: Rob Hartman (via email)
Tooele County Health Department (via email)

DWQ-2017-009717



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF WATER QUALITY
Walter L. Baker, P.E.
Director

APR 27 2017

Tom Tripp
Director of Technical Services and Development
238 North 2200 West
Salt Lake City, UT 84116-2921

Dear Mr. Tripp:

Subject: **Construction Permit** for the Planned Contingency Measures for the Current Wastewater Pond

On March 24, 2017, the Division of Water Quality (DWQ) received the draft engineering plans and specifications for the Planned Contingency Measures for the Current Wastewater Pond. The draft plans were reviewed and minor comments were emailed to you and Chad Tomlinson by DWQ on April 5, 2017. In response to those comments there were some minor changes and a new set of plans were emailed to Woodrow Campbell on April 13, 2017. The plans were revised and Issued for Construction and stamped by Chad Tomlinson a Utah registered Professional Engineer (P.E.).

The following is a summary of the proposed major construction projects:

- Berm in Skull Valley Diversion Ditch (SVDD) upstream of culvert 4
- Berm and Spillway in SVDD to Former Waste Pond
- Overflow Pipe to Former Waste Pond

The plans and specifications, as submitted, comply with *the Utah Water Quality Rules, (R317, Utah Administrative Code)*. A **Construction Permit** is hereby issued as constituted by this letter, subject to the following conditions:

1. *Any revisions or modifications to the approved plans and specifications must be submitted to DWQ for review and approval, before construction or implementation thereof. Please submit any changes for review and approval directly to Woodrow Campbell, P.E., of the DWQ Ground Water Protection Section.*
2. *A written operations and maintenance manual, containing a description of the functioning of the facilities, an outline of routine maintenance procedures, and all checklists and maintenance logs needed for proper operation of the system, must be submitted and approved before the final inspection and operation of the system.*
3. *The approved facilities must not be placed in service unless DWQ has conducted a final inspection, reviewed and approved the As-Built Construction Certification Report, and provided written authorization to place the constructed facilities in service.*

The plans and specifications for this project have been stamped and signed by a Professional Engineer currently licensed to practice in the state of Utah. The construction design, inspection supervision, and written construction certification of all work associated with this Construction Permit must be performed by a Professional Engineer licensed to practice in the state of Utah.

This Construction Permit will expire one year from the date of its issuance, as evidenced by the date of this letter, unless substantial progress is made in constructing the approved facilities or the plans and specifications have been resubmitted and the construction permit is reissued. This permit does not relieve you, in any way, of your obligations to comply with other applicable local requirements. You may contact our Tooele County Health Department for further assistance regarding local matters.

Please contact Mr. Campbell at the beginning of construction to allow periodic inspections to be scheduled. Upon completion of the project, a final inspection and approval of the As-Built Construction Certification Report is required before the approval to operate the completed facilities can be issued. Please remain in contact with Mr. Campbell to schedule the final inspection. The Construction Certification Report with final as-built drawings must include test results for the following construction quality assurance and quality control (CQA/QC) elements:

Soil Subgrade

- Proctor Curves
- Soil Classification
- Field Compaction Testing
- Subgrade Acceptance Certification

Flexible Membrane Liner

- Trial Seam Test Log
- Seaming Record
- Seam Test Record
- Repair Log, and
- As-Built Drawing
- Professional Engineer Certification

If we can be of further assistance, please contact Mr. Woodrow Campbell at wwcampbell@utah.gov or (801) 536-4353.

Sincerely,

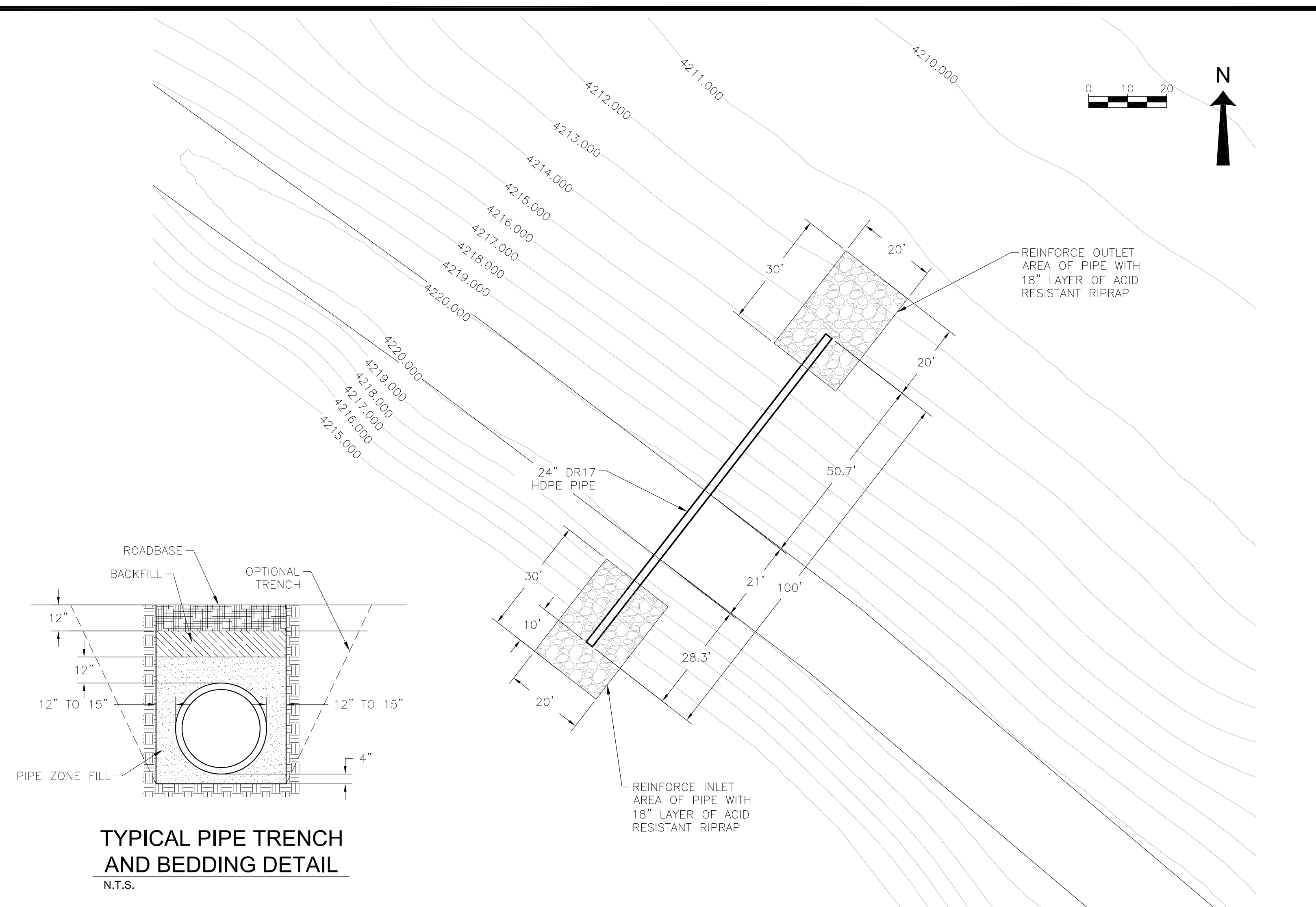


Walter L. Baker, P.E.
Director

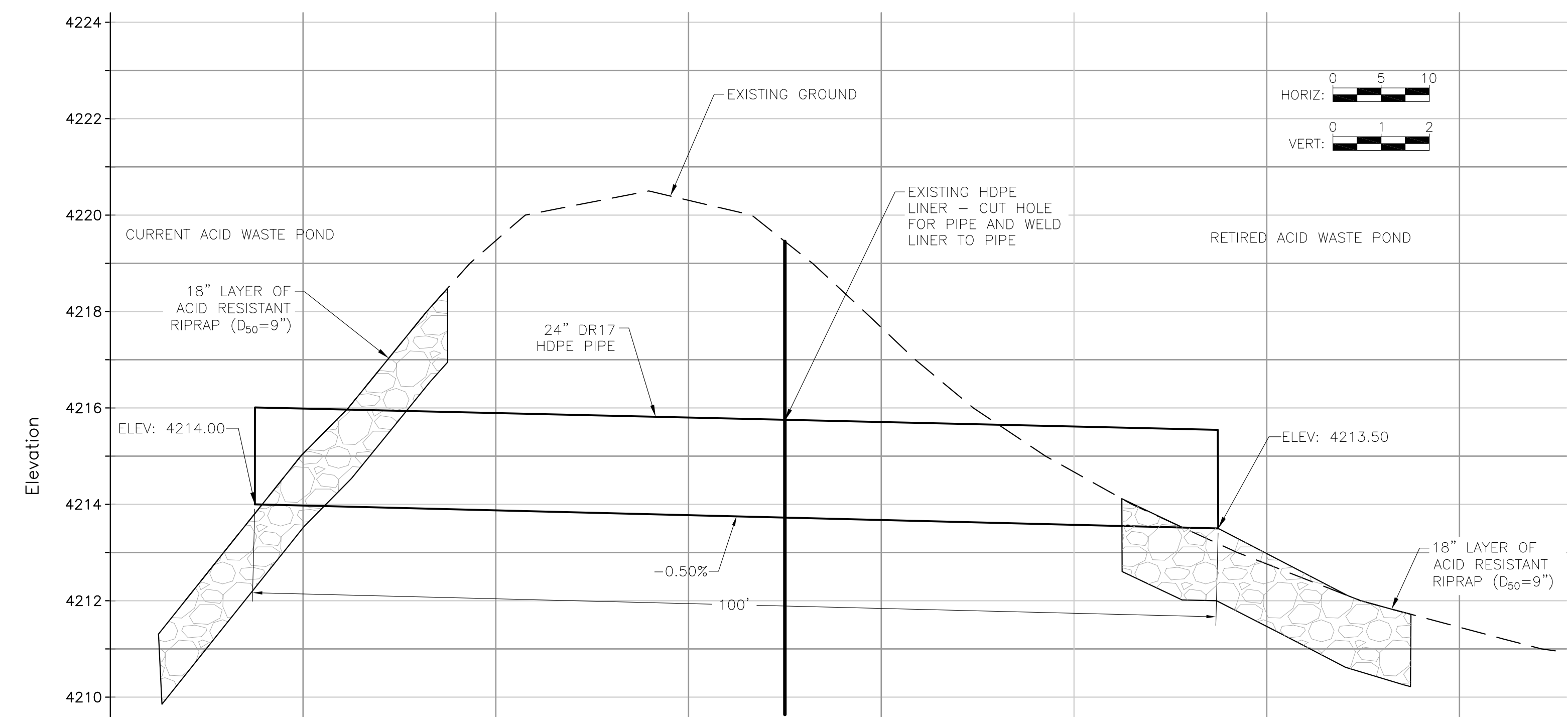
Attachment: Construction Plans and Specifications

WLB/WWC/DJH/smm

cc: Tooele County Health Department (via email w/o attachment)
Chad Tomlinson, Stantec (via email)

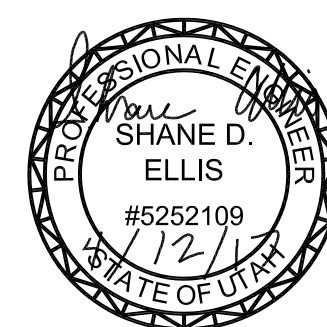


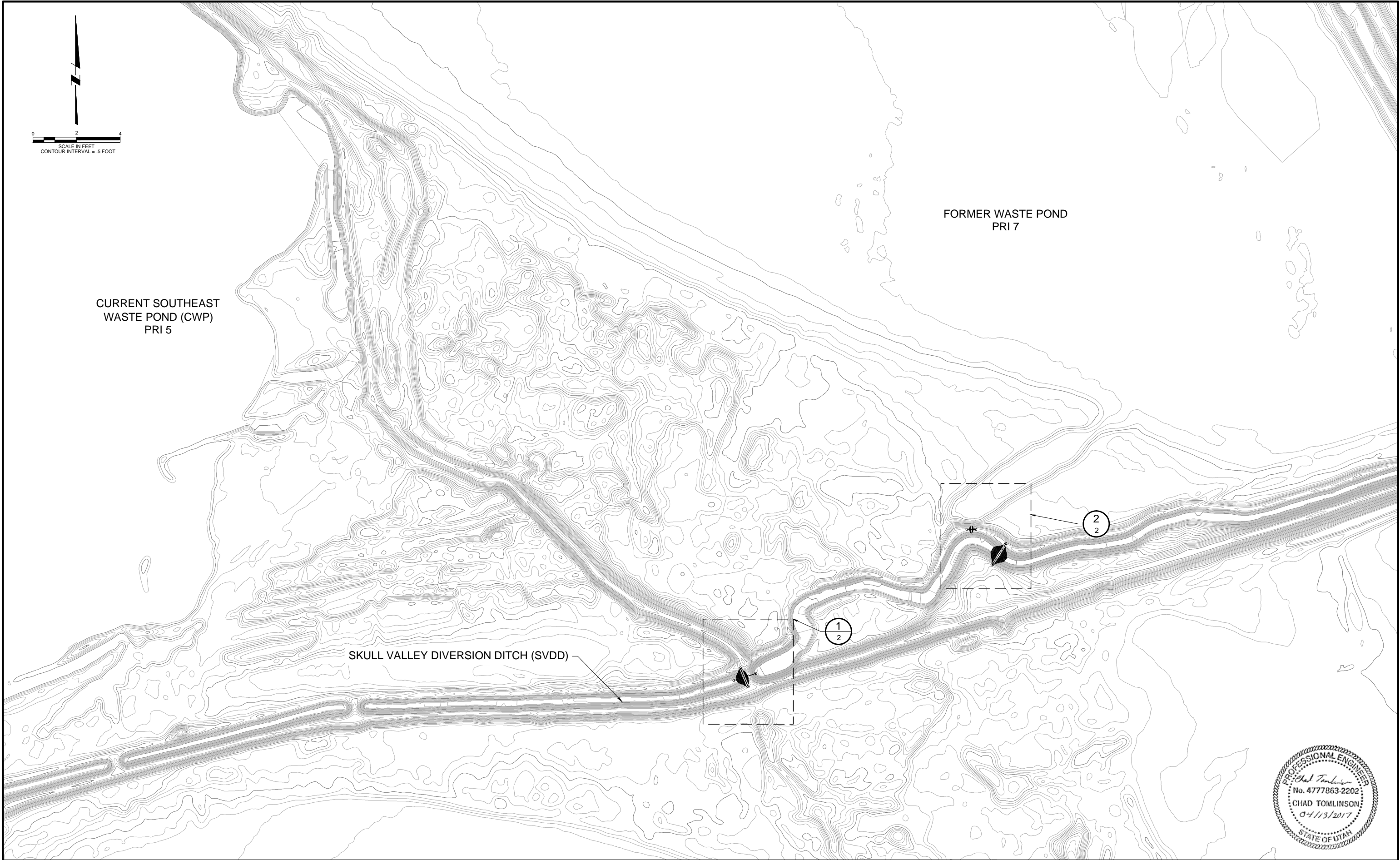
TYPICAL PIPE TRENCH
AND BEDDING DETAIL
N.T.S.



PIPE SECTION VIEW

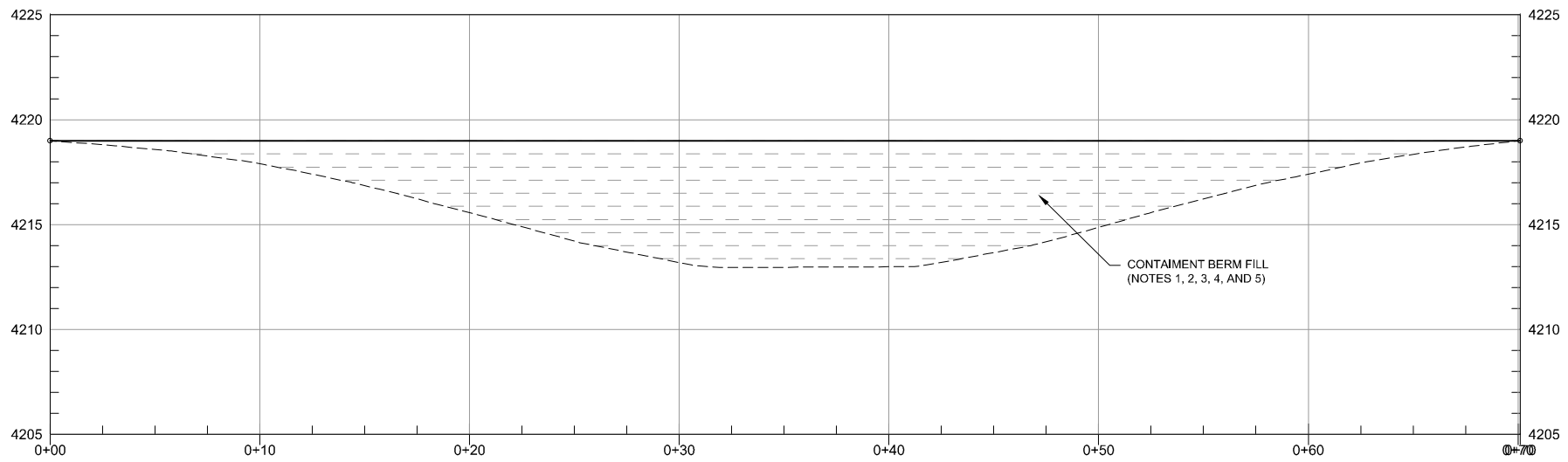
1. ALL PIPING TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
2. FILL IN PIPE ZONE SHALL BE WELL GRADED SILTY SAND OR GRAVEL (SW-SM, GW-GM) CONTAINING NO PARTICLES LARGER THAN $\frac{1}{4}$ " PLACED IN 6" LIFTS AND COMPACTED TO 92% OF MAXIMUM DENSITY AT $\pm 2\%$ OF OPTIMUM MOISTURE PER ASTM 01557 MODIFIED PROCTOR. LIFTS SHALL BE CONSTRUCTED ON BOTH SIDES OF THE PIPE SIMULTANEOUSLY.
3. BACKFILL SHALL BE COMPACTIBLE NATIVE SOIL TAKEN FROM THE TRENCH SPOILS AND COMPACTED IN 8" LOOSE LIFTS TO 92% OF MAXIMUM DENSITY AT $\pm 2\%$ OF OPTIMUM MOISTURE PER ASTM 01557 MODIFIED PROCTOR.
4. ROADBASE MATERIAL SHALL BE A $\frac{3}{4}$ " MINUS CRUSHED STONE MATERIAL WITH A LL LESS THAN 25, A PI OF 0, AND NO GREATER THAN 11% FINES. ROADBASE SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY $\pm 2\%$ OF OPTIMUM MOISTURE PER ASTM 01557 MODIFIED PROCTOR.
5. GREAT CARE SHALL BE TAKEN TO ENSURE NO VOIDS ARE LEFT IN PIPE HAUNCHES AND PIPE IS IN FIRM CONTACT WITH THE SOIL AROUND ITS FULL PERIMETER AND LENGTH.

[illegible]



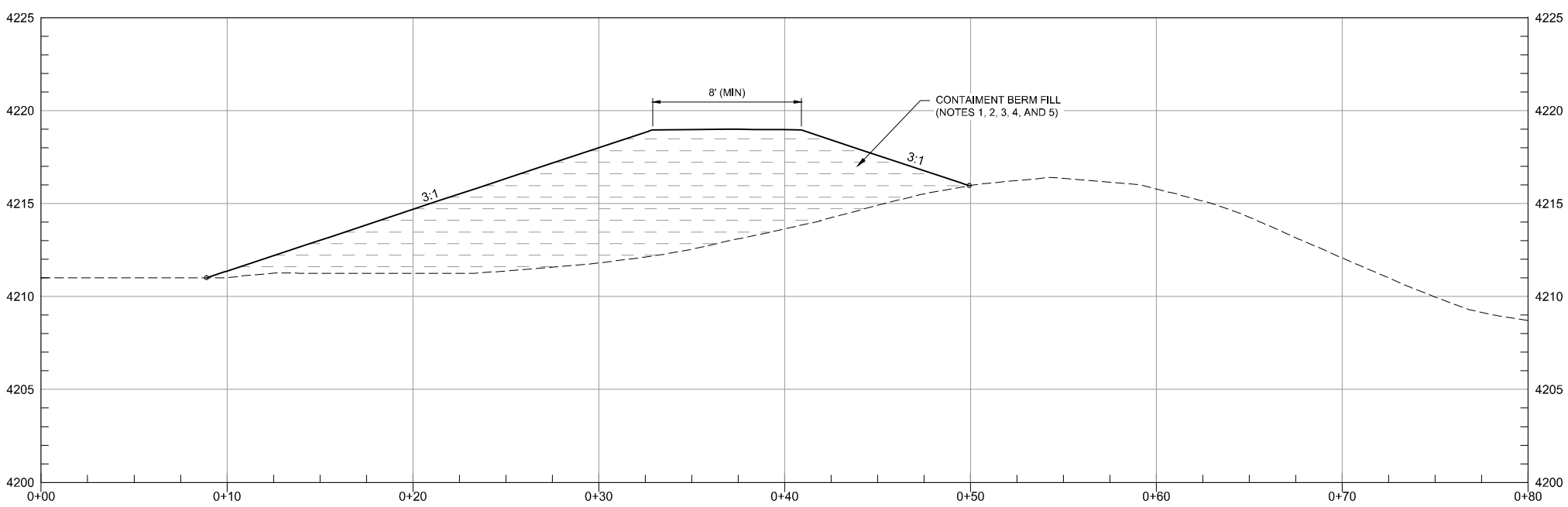
				SCALE	WARNING	DESIGNED <u>C.TIMLINSON</u>	 now part of 		GENERAL PLAN	DRAWING 1
				SHOWN	IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DRAWN <u>J.VERNER</u>				
0	4/12/2017	JTV	ISSUED FOR CONSTRUCTION			CHECKED <u>K.GUNDENKAUF</u>				
REV	DATE	BY	DESCRIPTION							





A
2
NEW BERM UPSTREAM OF CULVERT 4 - LONGITUDINAL SECTION

HORZ 0 4 8
VERT 0 4 8
SCALE IN FEET



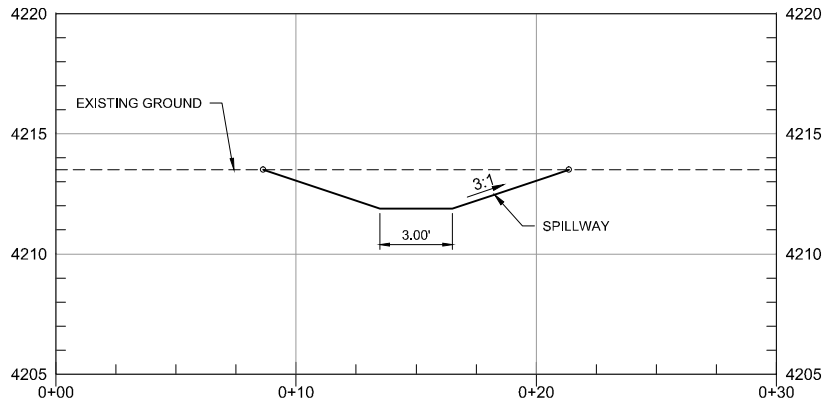
B
2
NEW BERM UPSTREAM OF CULVERT 4 - CROSS SECTION

HORZ 0 4 8
VERT 0 4 8
SCALE IN FEET

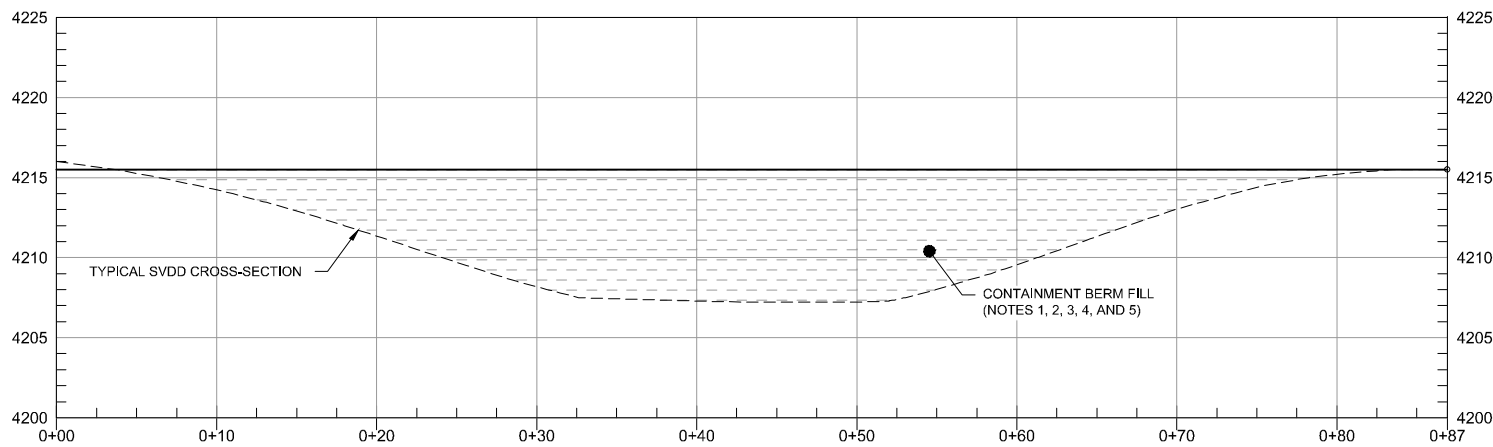
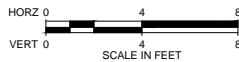
- NOTES:**
1. BASE OF SVDD UNDERLYING CONTAINMENT BERM TO BE FREE OF LIQUID AND SCARIFIED PRIOR TO PLACEMENT OF CONTAINMENT BERM FILL.
 2. CONTAINMENT BERM FILL TO BE PLACED IN MAXIMUM 12" LOOSE LIFTS.
 3. CONTAINMENT BERM FILL TO CONTAIN A MINIMUM OF 50% PASSING A #200 SIEVE AND A MINIMUM PLASTICITY INDEX OF 15.
 4. CONTAINMENT BERM FILL TO BE COMPACTED TO MINIMUM OF 92% MAXIMUM DRY DENSITY OF STANDARD PROCTOR AT 2% MOISTURE .
 5. THE TOP SURFACE OF EACH COMPACTED LIFT TO BE SCARIFIED PRIOR TO PLACEMENT OF EACH SUBSEQUENT LIFT.



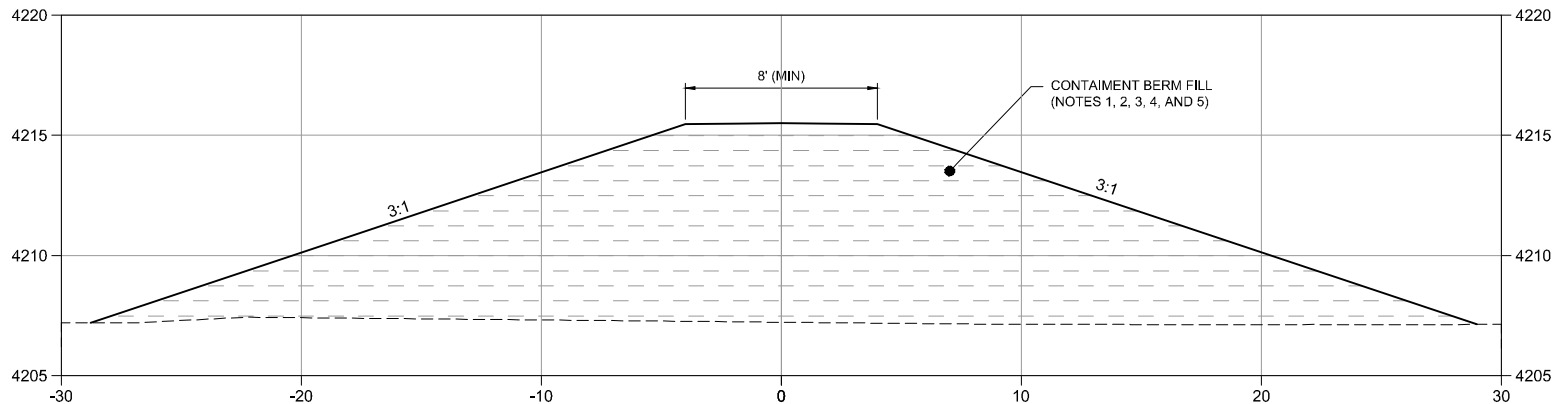
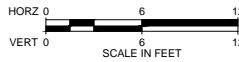
				SCALE	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED <u>C.TIMLINSON</u>	 now part of 		NEW BERM IN SVDD UPSTREAM OF CULVERT 4 SECTIONS AND DETAILS	DRAWING 3
0	4/12/2017	JTV	ISSUED FOR CONSTRUCTION	SHOWN		DRAWN <u>J. VERNER</u>				
REV	DATE	BY	DESCRIPTION			CHECKED <u>K.GUNDENKAUF</u>				



C
2 SPILLWAY - SVDD TO FORMER WASTE POND



D
2 EMBANKMENT BERM LONGITUDINAL SECTION



E
2 EMBANKMENT BERM CROSS SECTION



NOTES:

1. BASE OF SVDD UNDERLYING CONTAINMENT BERM TO BE FREE OF LIQUID AND SCARIFIED PRIOR TO PLACEMENT OF CONTAINMENT BERM FILL.
2. CONTAINMENT BERM FILL TO BE PLACED IN MAXIMUM 12" LOOSE LIFTS.
3. CONTAINMENT BERM FILL TO CONTAIN A MINIMUM OF 50% PASSING A #200 SIEVE AND A MINIMUM PLASTICITY INDEX OF 15.
4. CONTAINMENT BERM FILL TO BE COMPACTED TO MINIMUM OF 92% MAXIMUM DRY DENSITY OF STANDARD PROCTOR AT 2% MOISTURE.
5. THE TOP SURFACE OF EACH COMPACTED LIFT TO BE SCARIFIED PRIOR TO PLACEMENT OF EACH SUBSEQUENT LIFT.



REV	DATE	BY	DESCRIPTION
0	4/12/2017	JTV	ISSUED FOR CONSTRUCTION

SCALE

SHOWN

WARNING

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED C.TIMLINSON

DRAWN J.VERNER

CHECKED K.GUNDENKAUF



BERM AND SPILLWAY
SVDD TO FORMER WASTE POND
SECTIONS

DRAWING

4

APPENDIX C

Photographs



Photo 1. North embankment, repaired and fortified area of former breach



Photo 2. North embankment, repaired and fortified area of former breach and widening of north embankment

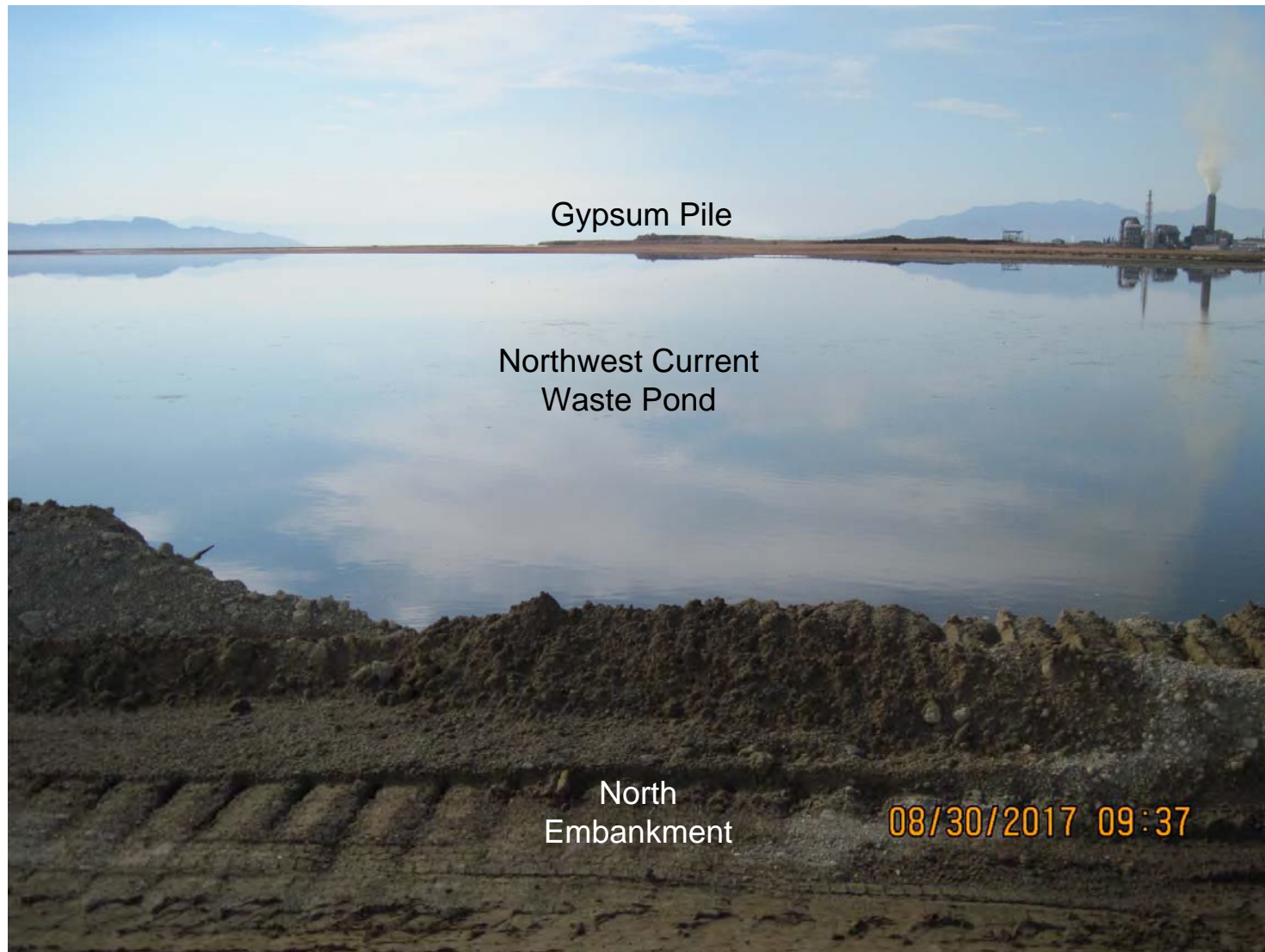


Photo 3. North embankment, view toward east



Photo 4. North embankment, view toward northeast



Photo 5. North embankment, view toward northwest

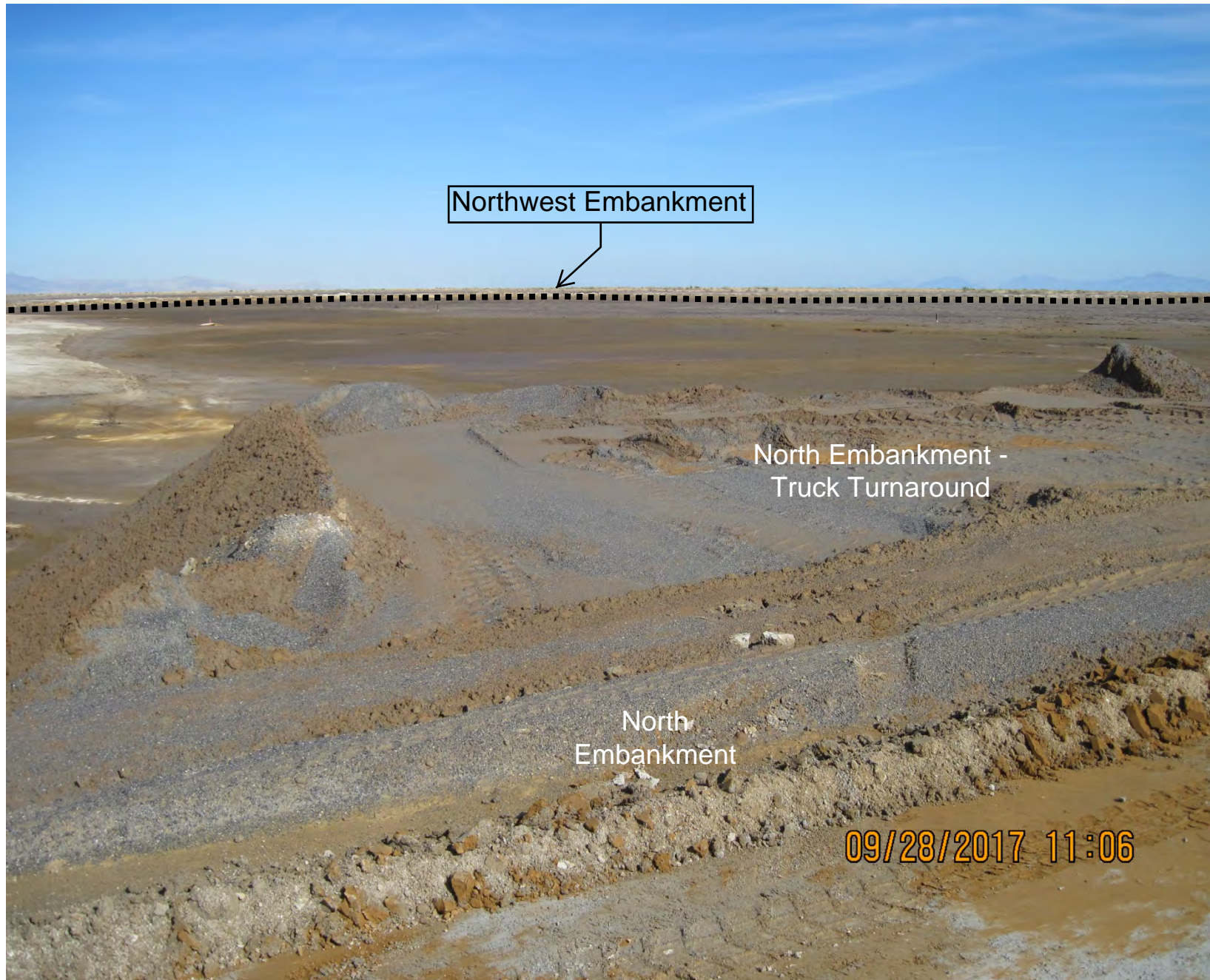


Photo 6. North embankment, view toward northwest

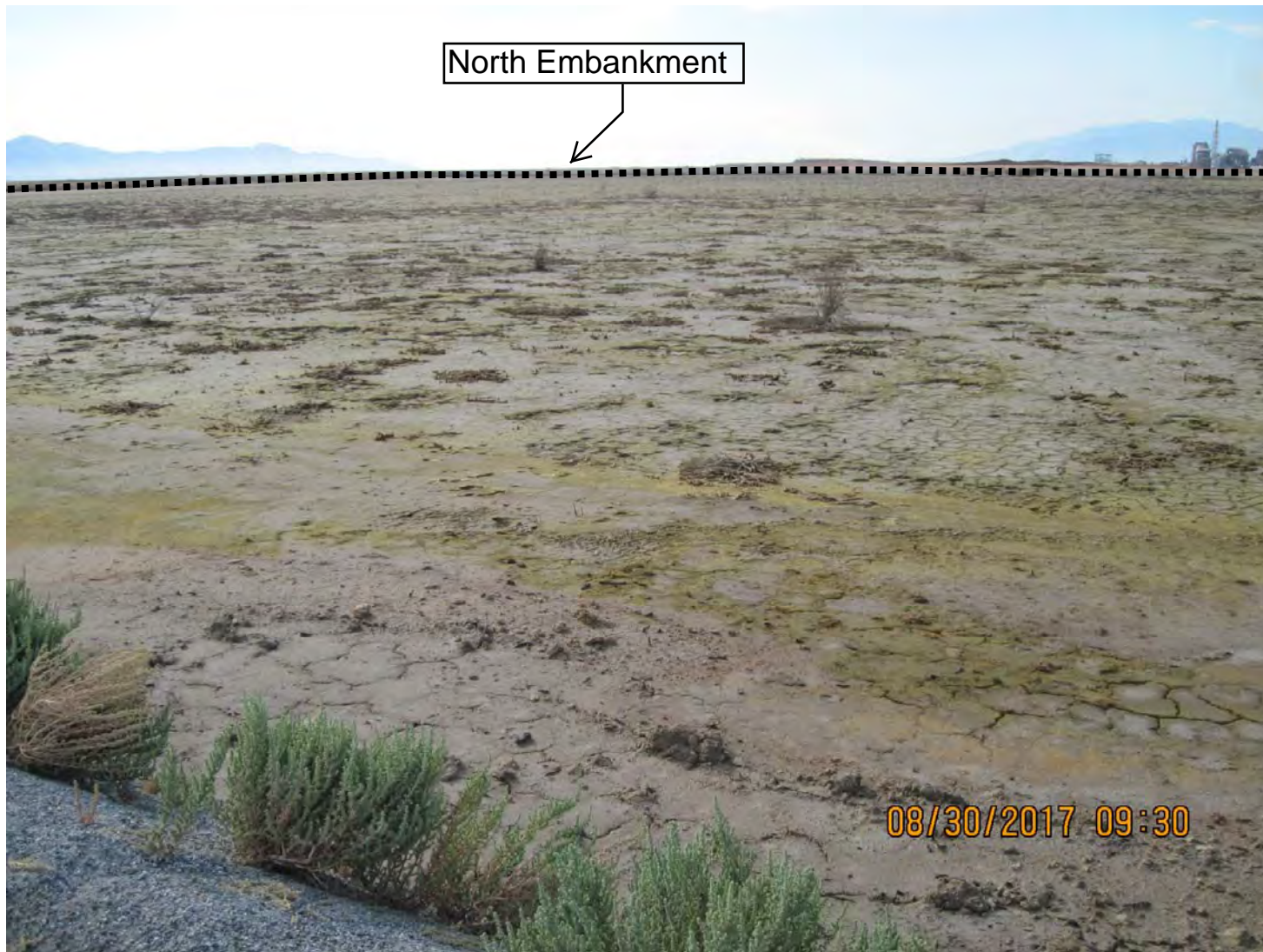


Photo 7. Northwest embankment, view toward east-southeast



Photo 8. Northwest embankment, view northwest toward perimeter fence



Photo 9. Northwest embankment, view northwest toward perimeter fence



Photo 10. Northeast corner of perimeter fence, view toward south



Photo 11. Northeast corner of perimeter fence, view toward west